TAPPING LARGE STEEL MAINS UNDER PRESSURE[1]

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There is a great deal that may be said on the subject of tapping large steel mains under pressure, but with much of it you are already familiar. As there are so many interesting subjects which superintendents have to discuss on this date, I do not think it would be just to you to take up your time with a repetition of details with which you are already acquainted.

Both the operating mechanism for cutting the steel mains and the method of doing the work are similar to those used in making connections to cast iron mains and will therefore need no description. This discussion will be confined, therefore, to the difficulties which must be overcome in making connections to large steel mains under pressure.

It is told of Michael Angelo that, when working on the Sistine Chapel, a fellow artist approached him and remonstrated with him on the time he was devoting to an obscure corner of the ceiling, saying, it is but a trifle, a detail. The Master answered "yes, that is true, but trifles make perfection and perfection is no trifle." The making of connections to large steel mains under pressure, satisfactorily, is a matter of details, trifles, and paying absolute attention to them.

Steel mains, whether made by the alternate inside and outside courses, or put together by telescopic taper joints, are never truly cylindrical. Measurements taken only a few feet apart on the same section of pipe will frequently show marked differences in contour. This fact occasions the principal difficulty in making connections to steel mains, as the lead joint between the tapping sleeve and the pipe cannot be satisfactorily calked unless the joint is approximately uniform and of the correct thickness. To secure that condition it is necessary to get the dimension of the pipe where the sleeve encircles it at both ends, also the dimension from the vertical axis around to the horizontal seam, the width of the seam, the height of the rivet head and the contour of the pipe at these several points.

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The contour of the pipe may be determined by encircling it with a flat ring whose diameter is larger than the largest axis of the pipe. This ring is adjusted on the pipe by thumb screws placed on the horizontal and vertical axis. The distance from the inner edge of the ring to the pipe is noted at intervals of 30 degrees around the periphery. From those dimensions the contour may be determined with enough exactness for practical purposes. The pattern for the sleeves is made to conform to the dimensions and contour of the pipe, due allowance being made for the desired thickness of joint. A cylindrical sleeve made to the nearest dimensions to suit the pipe would result in the sleeve and main being metal to metal at some point, while at others there would be 1½ to 2 inches of lead, which could not be satisfactorily calked. For this reason we must be certain that, with the correct pattern, care is exercised in the foundry in the molding and cooling of the casting to see that it is in accordance with the pattern. If care is not taken, deformation will result, necessitating scrapping the casting or causing trouble in doing the work.

The sleeve casting, being tested and found correct to dimensions and contour, is adjusted on the pipe in the same manner as in doing the work on cast iron mains. In pouring and calking the joint, however, greater care must be exercised, as the sheet steel presents a comparatively smooth surface and the lead will not form as close frictional contact with it as it does with the rough surface of cast iron pipe. For that reason it is advisable to pour the lead as hot as possible. The calking should be done only by one who has had experience in working on steel mains as the lead must be thoroughly upset and driven hard, but in doing so the pipe must not be deflected.

In operating the cutting mechanism in both the drilling and cutting operations, particular attention must be given to keep a light continuous feed. If the feed is interrupted the cuttings will be ground between the cutters and the pipe, thus destroying the cutting edge which makes necessary the removal of the cutter for resharpening—something that should be avoided. On the other hand, if the feed be heavy or erratic, the pipe is so flexible that it is easily deflected and the lead joint broken or worse still, one of the teeth of the cutter may be broken which means the removal of the cutter.

These several obstacles may be readily overcome by absolute attention to the several details, taking care that this work is entrusted to men who have had experience in this particular line.